

(4) Any integral pallet base forming part of an intermediate bulk container, or any detachable pallet, must be suitable for the mechanical handling of an intermediate bulk container filled to its maximum permissible gross mass.

(i) The pallet or integral base must be designed to avoid protrusions that may cause damage to the intermediate bulk container in handling.

(ii) The outer packaging must be secured to any detachable pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface must be free from sharp protrusions that might damage the intermediate bulk container.

(iii) Strengthening devices, such as timber supports to increase stacking performance, may be used but must be external to the inner liner.

(iv) The load-bearing surfaces of intermediate bulk containers intended for stacking must be designed to distribute loads in a stable manner.

§ 178.709 Standards for wooden intermediate bulk containers.

(a) The provisions in this section apply to wooden intermediate bulk containers intended to contain solids that are loaded or discharged by gravity. Wooden intermediate bulk container types are designated:

(1) 11C Natural wood with inner liner.

(2) 11D Plywood with inner liner.

(3) 11F Reconstituted wood with inner liner.

(b) Definitions for wooden intermediate bulk containers:

(1) *Wooden intermediate bulk containers* consist of a rigid or collapsible wooden body together with an inner liner (but no inner packaging) and appropriate service and structural equipment.

(2) *Liner* means a separate tube or bag, including the closures of its openings, inserted in the body but not forming an integral part of it.

(c) Construction requirements for wooden intermediate bulk containers are as follows:

(1) Top lifting devices are prohibited in wooden intermediate bulk containers.

(2) The strength of the materials used and the method of construction must be appropriate to the capacity and in-

tended use of the intermediate bulk container.

(i) Natural wood used in the construction of an intermediate bulk container must be well-seasoned, commercially dry, and free from defects that would materially lessen the strength of any part of the intermediate bulk container. Each intermediate bulk container part must consist of uncut wood or a piece equivalent in strength and integrity. Intermediate bulk container parts are equivalent to one piece when a suitable method of glued assembly is used (i.e., a Lindermann joint, tongue and groove joint, ship lap or rabbet joint, or butt joint with at least two corrugated metal fasteners at each joint, or when other methods at least equally effective are used). Materials other than natural wood may be used for the construction of structural equipment of the outer packaging.

(ii) Plywood used in construction of bodies must be at least 3-ply. Plywood must be made of well-seasoned, rotary-cut, sliced or sawn veneer, commercially dry, and free from defects that would materially lessen the strength of the body. All adjacent plies must be glued with water-resistant adhesive. Materials other than plywood may be used for the construction of structural equipment of the outer packaging.

(iii) Reconstituted wood used in construction of bodies must be water resistant reconstituted wood such as hardboard or particle board. Materials other than reconstituted wood may be used for the construction of structural equipment of the outer packaging.

(iv) Wooden intermediate bulk containers must be firmly nailed or secured to corner posts or ends or be assembled by similar devices.

(3) The strength of the material used and the construction of the liner must be appropriate to the capacity of the intermediate bulk container and its intended use. Joints and closures must be sift-proof and capable of withstanding pressures and impacts liable to occur under normal conditions of handling and transportation.

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(ii) The outer packaging must be secured to any detachable pallet to ensure stability in handling and transportation. Where a detachable pallet is used, its top surface must be free from sharp protrusions that might damage the intermediate bulk container.

(iii) Strengthening devices, such as timber supports to increase stacking performance, may be used but must be external to the inner liner.

(iv) The load-bearing surfaces of intermediate bulk containers intended for stacking must be designed to distribute loads in a stable manner.

§ 178.710 Standards for flexible intermediate bulk containers.

(a) The provisions of this section apply to flexible intermediate bulk containers intended to contain solid hazardous materials. Flexible intermediate bulk container types are designated:

- (1) 13H1 woven plastic without coating or liner.
- (2) 13H2 woven plastic, coated.
- (3) 13H3 woven plastic with liner.
- (4) 13H4 woven plastic, coated and with liner.
- (5) 13H5 plastic film.
- (6) 13L1 textile without coating or liner.
- (7) 13L2 textile, coated.
- (8) 13L3 textile with liner.
- (9) 13L4 textile, coated and with liner.
- (10) 13M1 paper, multiwall.
- (11) 13M2 paper, multiwall, water resistant.

(b) Definitions for flexible intermediate bulk containers:

(1) *Flexible intermediate bulk containers* consist of a body constructed of film, woven plastic, woven fabric, paper, or combination thereof, together with any appropriate service equipment and handling devices, and if necessary, an inner coating or liner.

(2) *Woven plastic* means a material made from stretched tapes or monofilaments.

(3) *Handling device* means any sling, loop, eye, or frame attached to the body of the intermediate bulk container or formed from a continuation of the intermediate bulk container body material.

(c) Construction requirements for flexible intermediate bulk containers are as follows:

(1) The strength of the material and the construction of the flexible intermediate bulk container must be appropriate to its capacity and its intended use.

(2) All materials used in the construction of flexible intermediate bulk containers of types 13M1 and 13M2 must, after complete immersion in water for not less than 24 hours, retain at least 85 percent of the tensile strength as measured originally on the material conditioned to equilibrium at 67 percent relative humidity or less.

(3) Seams must be stitched or formed by heat sealing, gluing or any equivalent method. All stitched seam-ends must be secured.

(4) In addition to conformance with the requirements of § 173.24 of this subchapter, flexible intermediate bulk containers must be resistant to aging and degradation caused by ultraviolet radiation.

(5) For plastic flexible intermediate bulk containers, if necessary, protection against ultraviolet radiation must be provided by the addition of pigments or inhibitors such as carbon black. These additives must be compatible with the contents and remain effective throughout the life of the container. Where use is made of carbon black, pigments, or inhibitors, other than those used in the manufacture of the tested design type, retesting may be omitted if the carbon black content, the pigment content or the inhibitor content does not adversely affect the physical properties of the material of construction. Additives may be included in the composition of the plastic material to improve resistance to aging, provided they do not adversely affect the physical or chemical properties of the material.

(6) No used material other than production residues or regrind from the same manufacturing process may be used in the manufacture of plastic